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Clear Creek and Gilpin Counties Broadband Assessment

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Octobe 04, 2013

Executive Summary

This report provides an assessment of the broadband environment for Clear Creek and Gilpin counties, Colorado. The methodology for this assessment involved 3 elements: a) speed mapping b) resource mapping and c) demand mapping.

Speed Mapping
Speed mapping refers to a process of gathering a) advertised speeds (internet speeds reported by service providers to state and federal authorities) and then comparing them to b) actual speeds or what the subscriber actually receives from the service provider. This assessment found a wide disparity between advertised and actual internet speeds.

Resource Mapping
Assessing the resources that comprise potential broadband infrastructure provides an explanation for a) deficiencies in the broadband network and b) resources that might improve the broadband environment. This assessment found a number of middle mile resources that are currently underutilized which could contribute to a state-of-the-art middle mile market.

Demand Mapping
The above mapping processes would be pointless if, as some service providers contend, "there is no business case for this community". Any honest business case would take potential sales (demand) into account in synch with any potential investment in infrastructure. Surveys of both residential as well as enterprise (community anchors and businesses) indicate that demand exceeds what is currently marketed by service providers.

Analysis
An overview of the broadband environment based on the 3 mapping processes is provided.

Recommendations
It is recommended that this report be made public for review by the public (demand) and service providers (supply). In conjunction with publishing this report, Clear Creek and Gilpin county governments should jointly issue a Request for Information inviting service providers to provide information on how they would improve the broadband environment in Clear Creek and Gilpin counties.

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Introduction

A three-part mantra drives rural broadband development in Colorado:

(1) No one size fits all
(2) The best solutions are local
(3) It does NOT cost millions of dollars to bring broadband to rural Colorado

Further more, a methodology known as "the 5 A's" provides a robust means for community planners in improving their broadband environment. Those "5 A's" are:

(1) Aggregate Experience
(2) Assess Broadband Environment
(3) Assess and Aggregate Demand
(4) Adopt Existing Resources and Solutions
(5) Adapt for Sustainability

This Assessment is comprised of three mapping processes

1) Speed Mapping
2) Resource Mapping
3) Demand Mapping

The data gathered, summarized and reported is designed to help community leaders and service providers alike understand the current broadband environment and guide them in making decisions to improve the broadband environment.

Speed Mapping

Broadband is defined by the Federal Communications Commission as being a downstream speed of 4 megabits per second (Mbps) and upstream speed of 1 Mbps. Until that condition is met, a subscriber does not have broadband. Monitoring of internet speeds is the first step in assessing one's broadband environment.

Internet speeds are classified in two categories by the FCC and national Telecommunications and Information Administration (NTIA): a) advertised speeds or that which the service provider advertises as being the speed available in a given market b) actual speeds based on internet speed tests. The following figures provide contrasts in advertised speeds for Clear Creek and Gilpin counties as gathered by Colorado Broadband Data and Development for the Colorado and National Broadband Maps versus speed test data gathered in a survey by Clear Creek and Gilpin counties, Internet3 and Mobile Pulse.

Advertised Speeds

The following figures detail advertised speeds for Clear Creek and Gilpin counties.

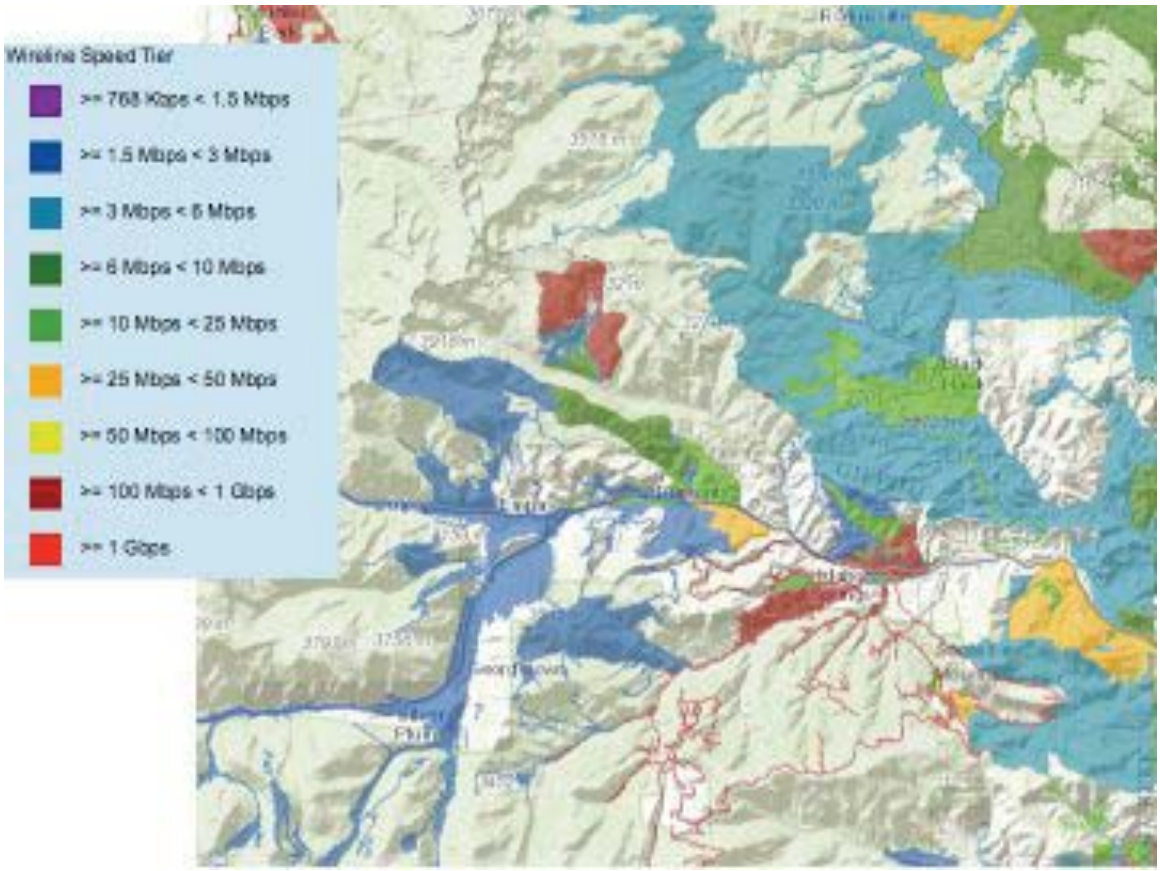

Figure 1 Advertised speeds for Gilpin and Clear Creek counties indicate Idaho Springs, Black Hawk and Central City have access to 1 Gbps internet speeds on wirelene (telephone company infrastructure or cable modem)

Source: Colorado Broadband Data and Development Program
http://www.colorado.gov/oit/broadband

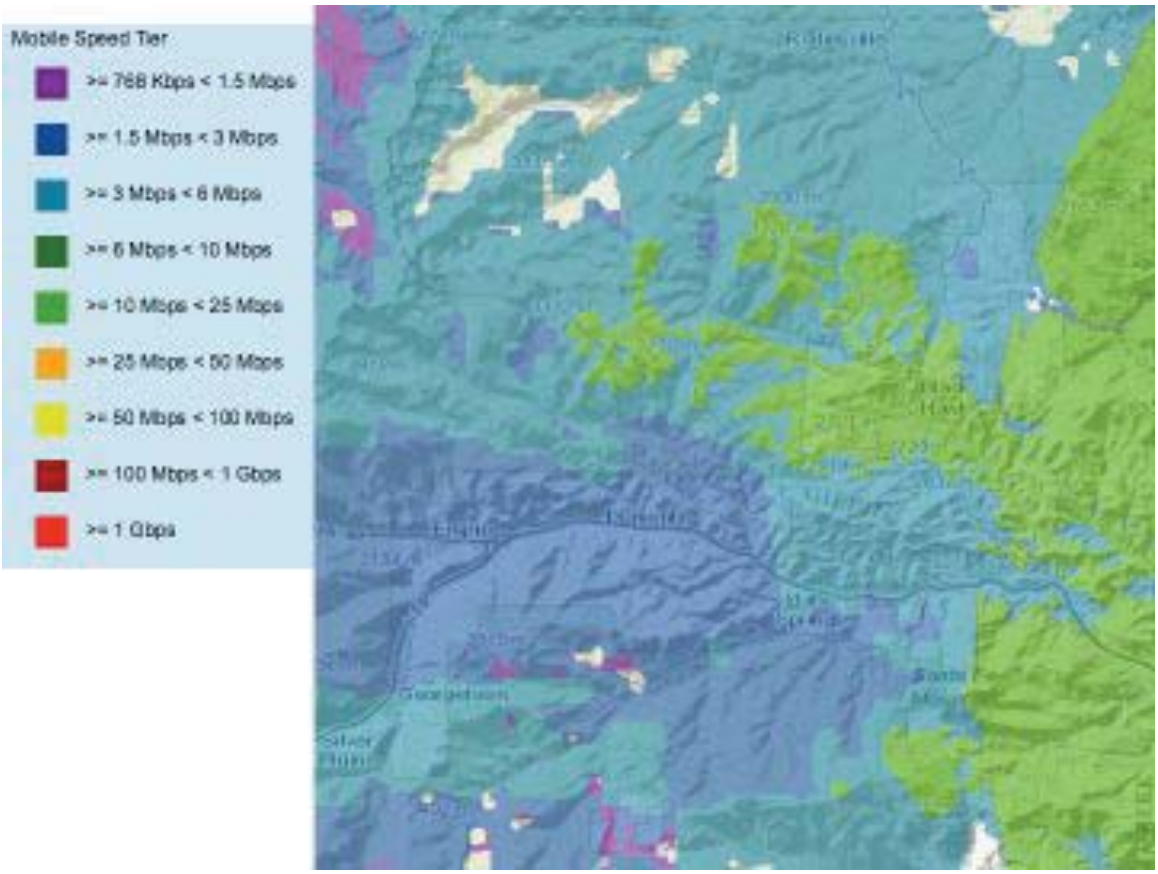

Figure 2 Map of advertised mbile (cellular) speeds for Clear Creek and Gilpin counties indicate Black Hawk and Central city have access to speeds of up to 25 Mbps on mobile 4G devices.

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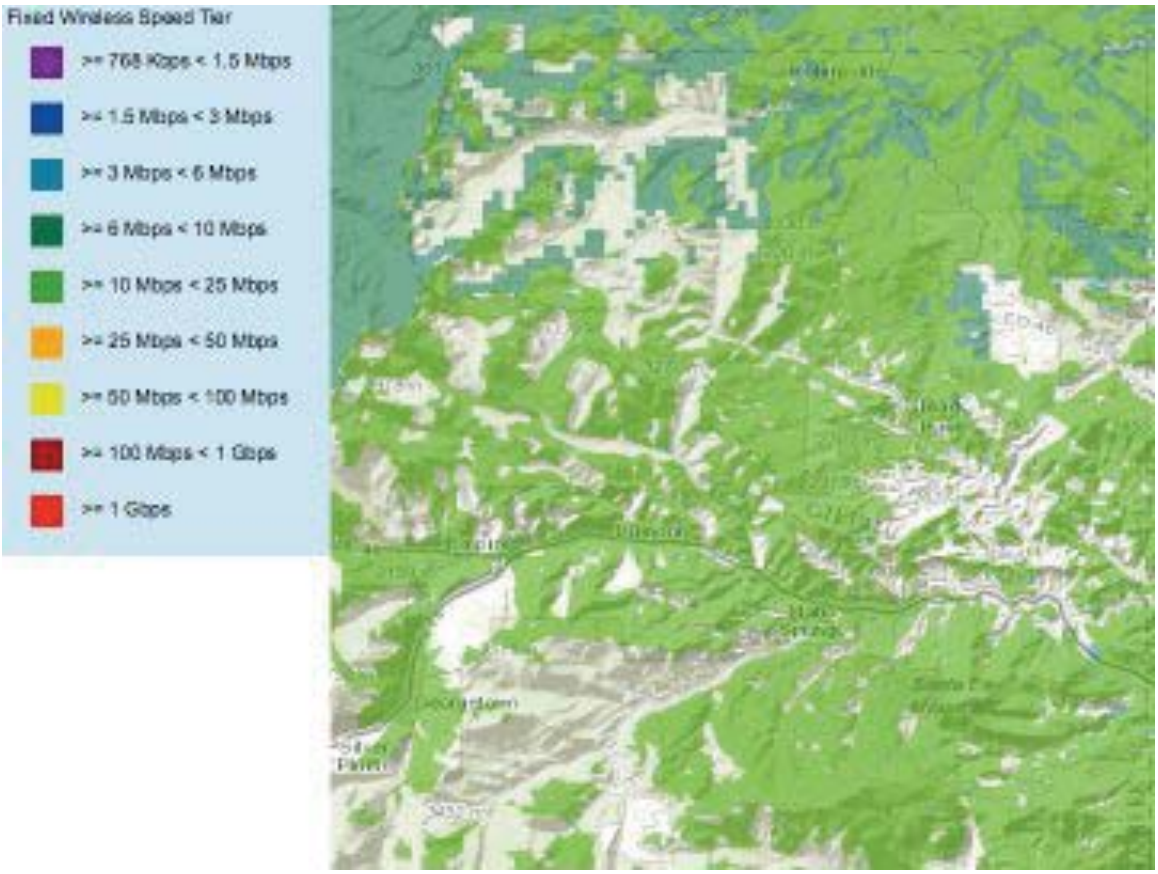


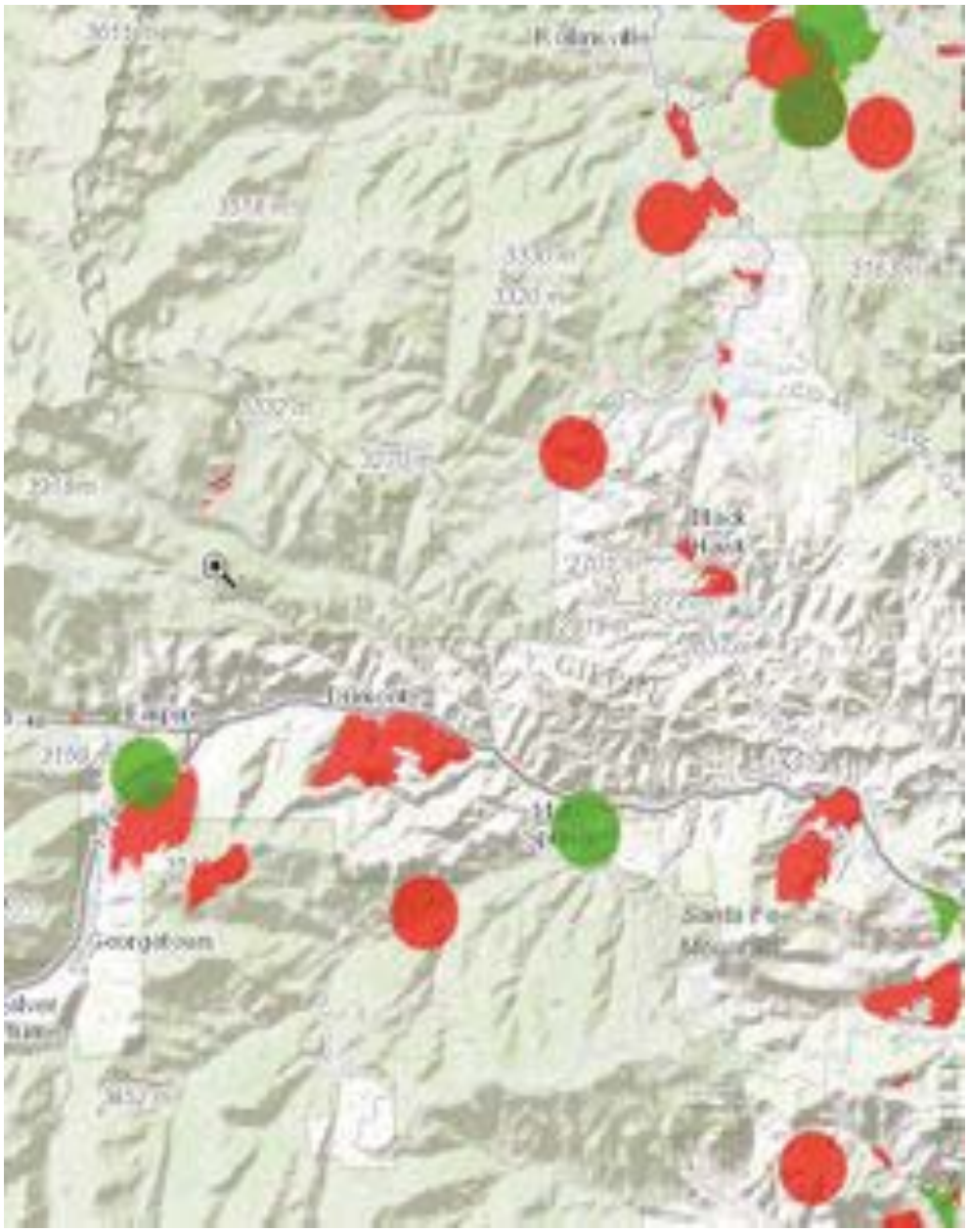
Figure 3 Map of advertised fixed wireless speeds indicates speeds of up to 25 mbps are available throughout Gilpin and Clear Creek counties.

Source: Colorado Broadband Data and Development Program
http://www.colorado.gov/oit/broadband

Actual Speeds

Internet3 in conjunction with Mobile Pulse, Clear Creek and Gilpin counties, gathered speed test data in September of 2013. Mobile Pulse generously provided their "app" as well as data gathered by Mobile Pulse dating back to January 2013. Thousands of "hits" were analyzed to determine where broadband, as defined by the Federal Communications Commission (FCC) as 4 megabits per second (Mbps) downstream and 1 Mbps upstream, might be available. In contrast to the "advertised" speed data gathered for inclusion in the National and Colorado Broadband Maps, the maps that follow are based on the data gathered using the

Mobile Pulse app which was distributed via Clear Creek and Gilpin County governments and the State Internet Portal Authority (SIPA).



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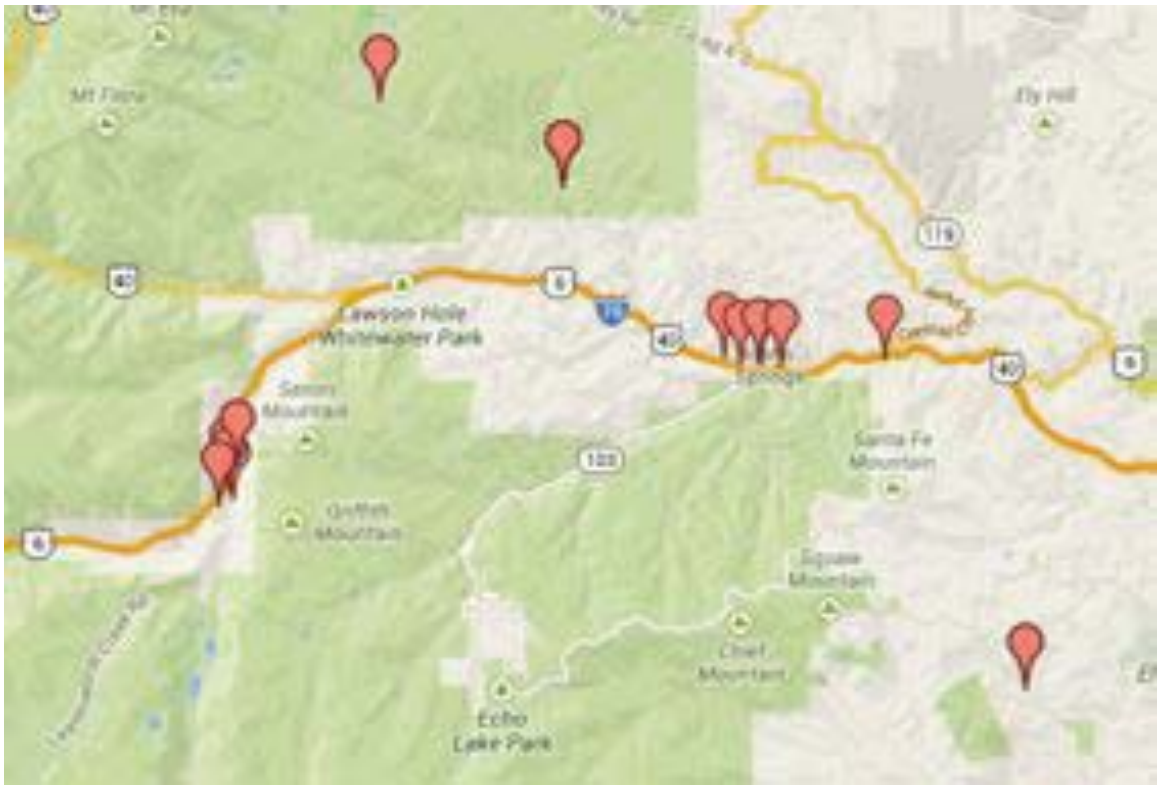

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Figure 7 Mobile Pulse: Failed cellular upload tests in Clear Creek county

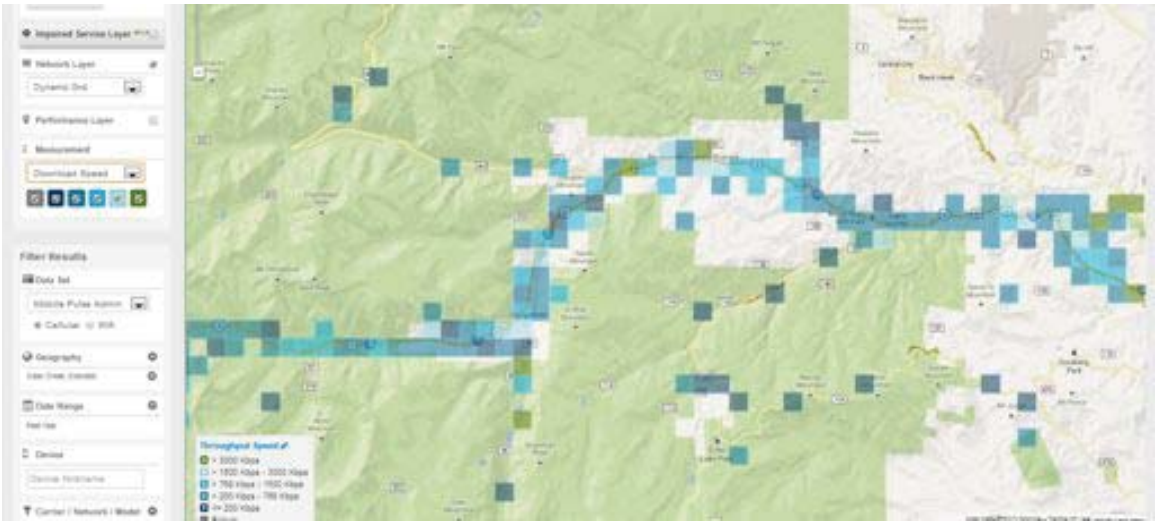

Figure 8 Mobile Pulse: Cellular download speeds in Clear Creek county

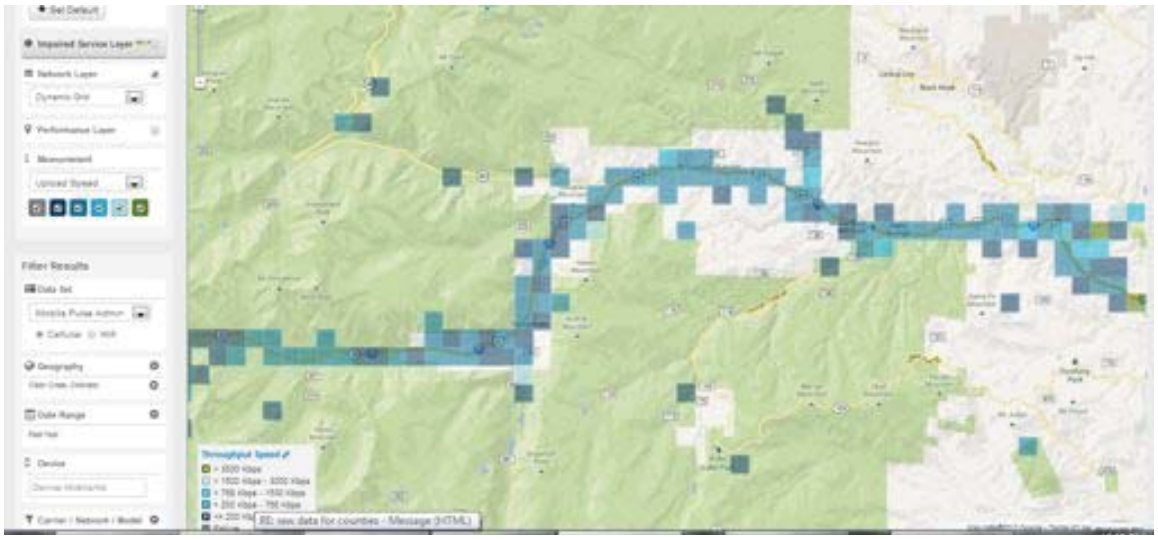

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Figure 10 Speed tests on Wi-Fi extrapolate landline or fixed wireless speeds in Gilpin County. Of note, no broadband speeds (4 down, 1 up) were recorded in Black Hawk or Central City. These points may connect to the internet via fixed wireless.

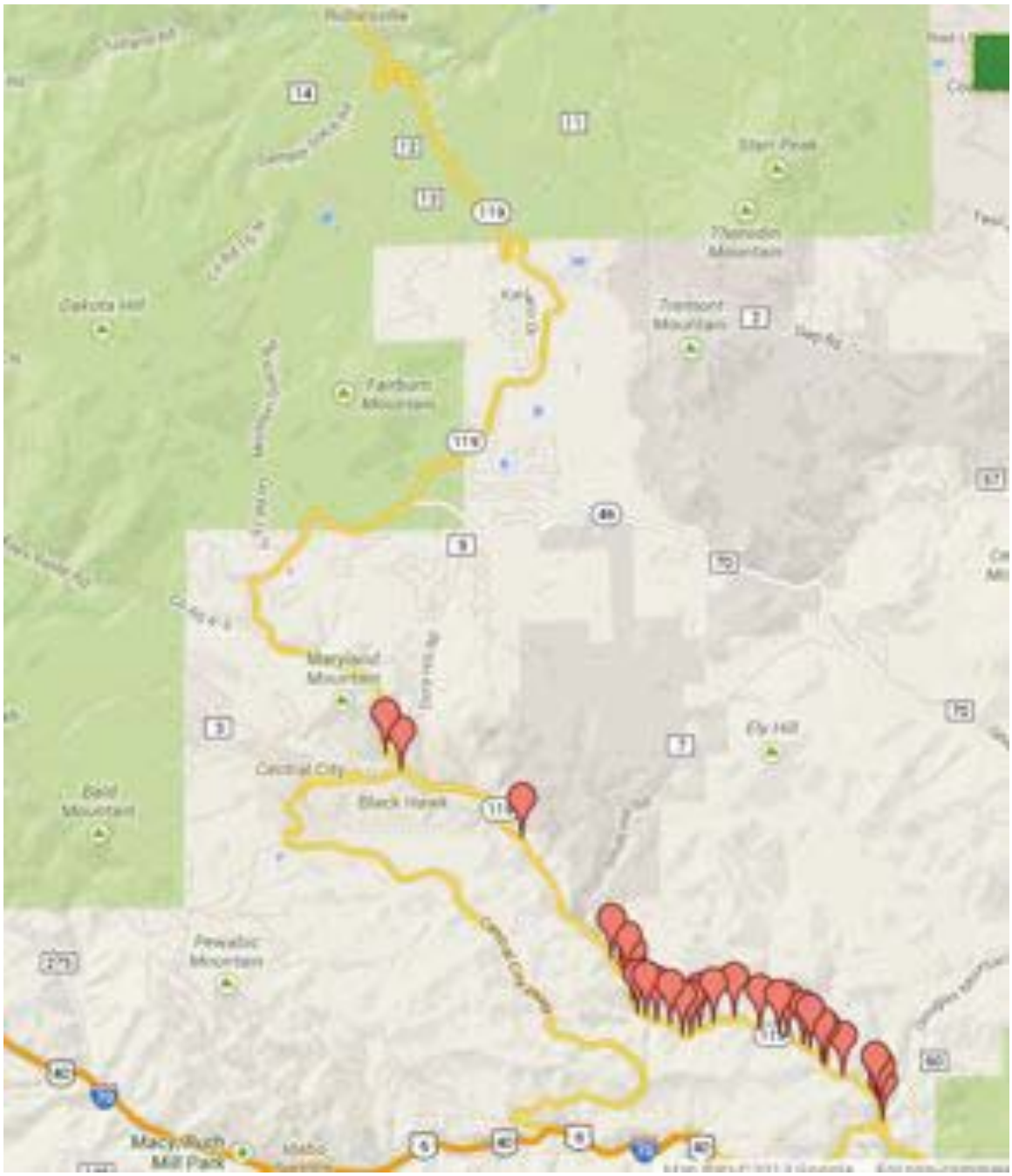


Figure 11 For Gilpin county, mobile broadband speeds that met the FCC's description of broadband were recorded exclusively on CO 119

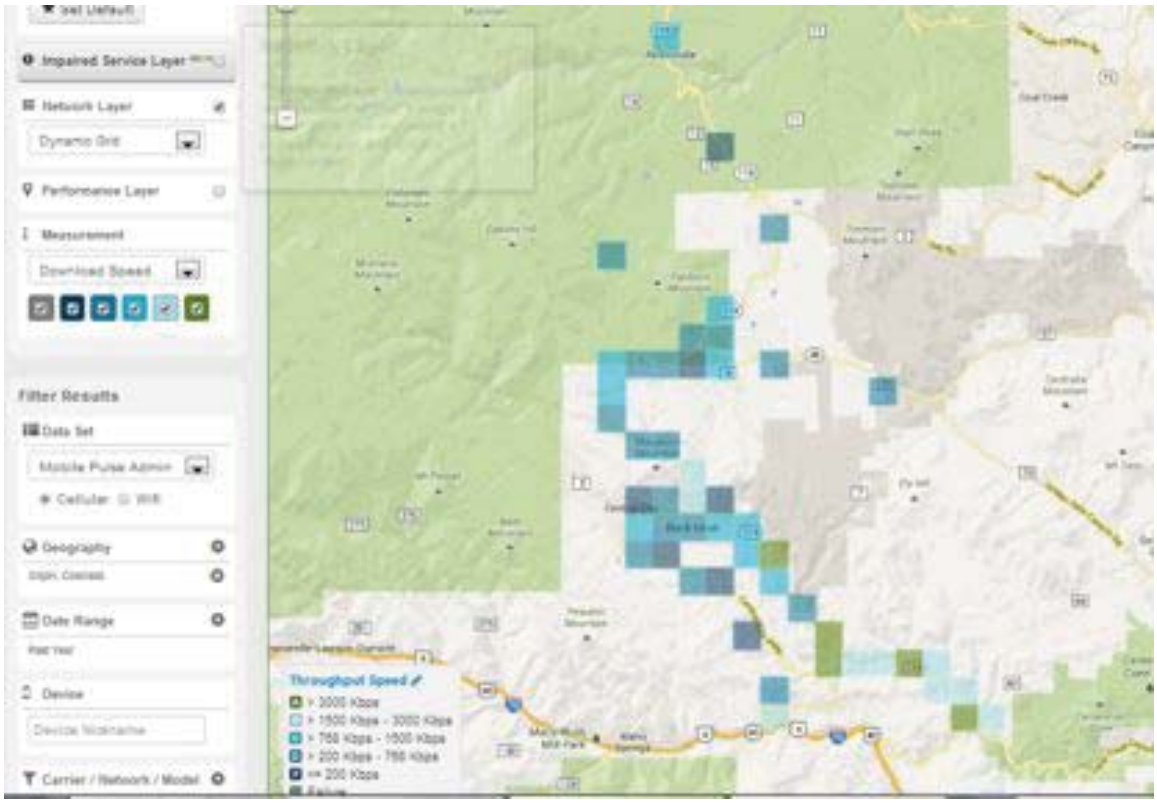


Figure 12 Mobile Pulse: Cellular download speeds in Gilpin county. Note handful of tests that exceeded 3 Mbps.

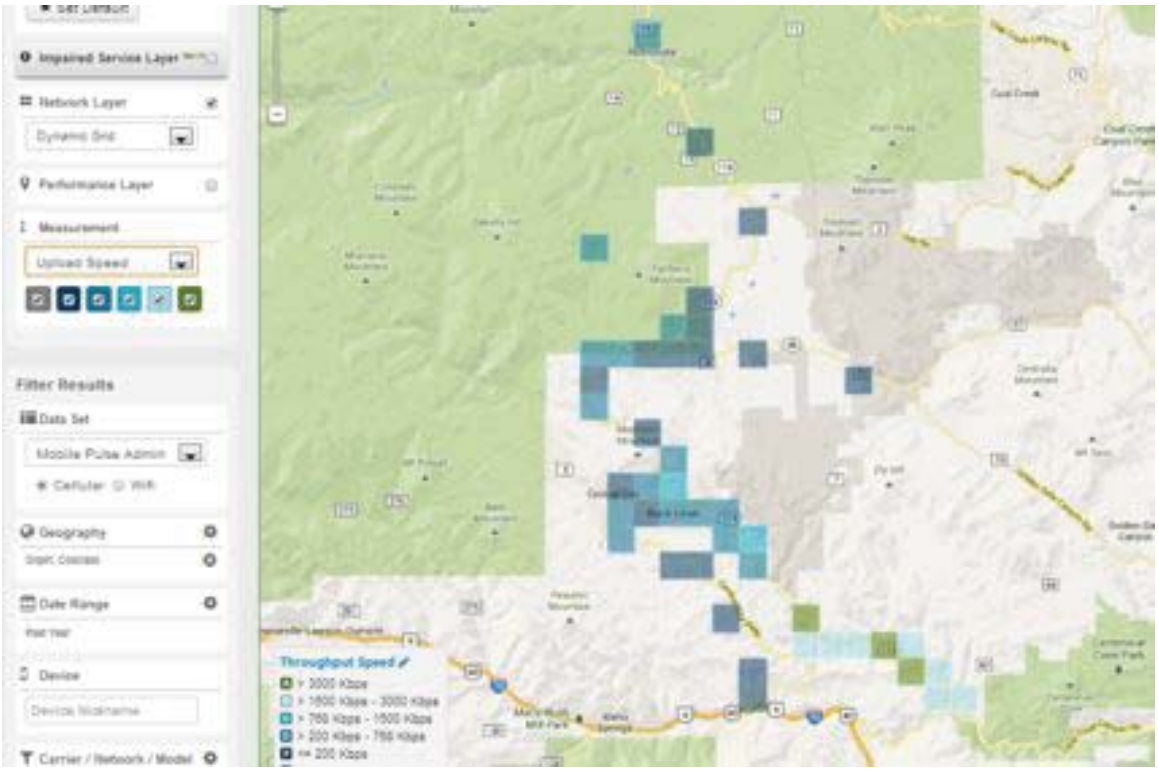


Figure 13 Mobile Pulse: Gilpin county cellular upload speeds. Note only 3 tests approach FCC definition of broadband

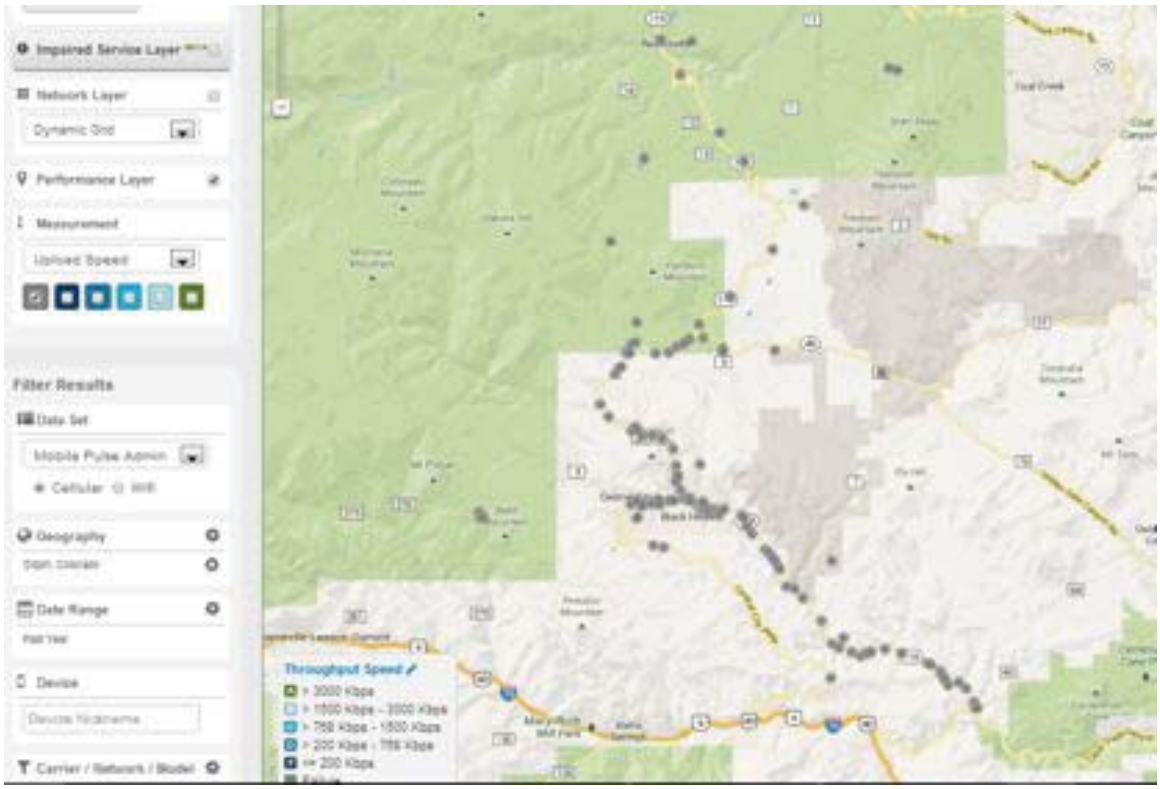


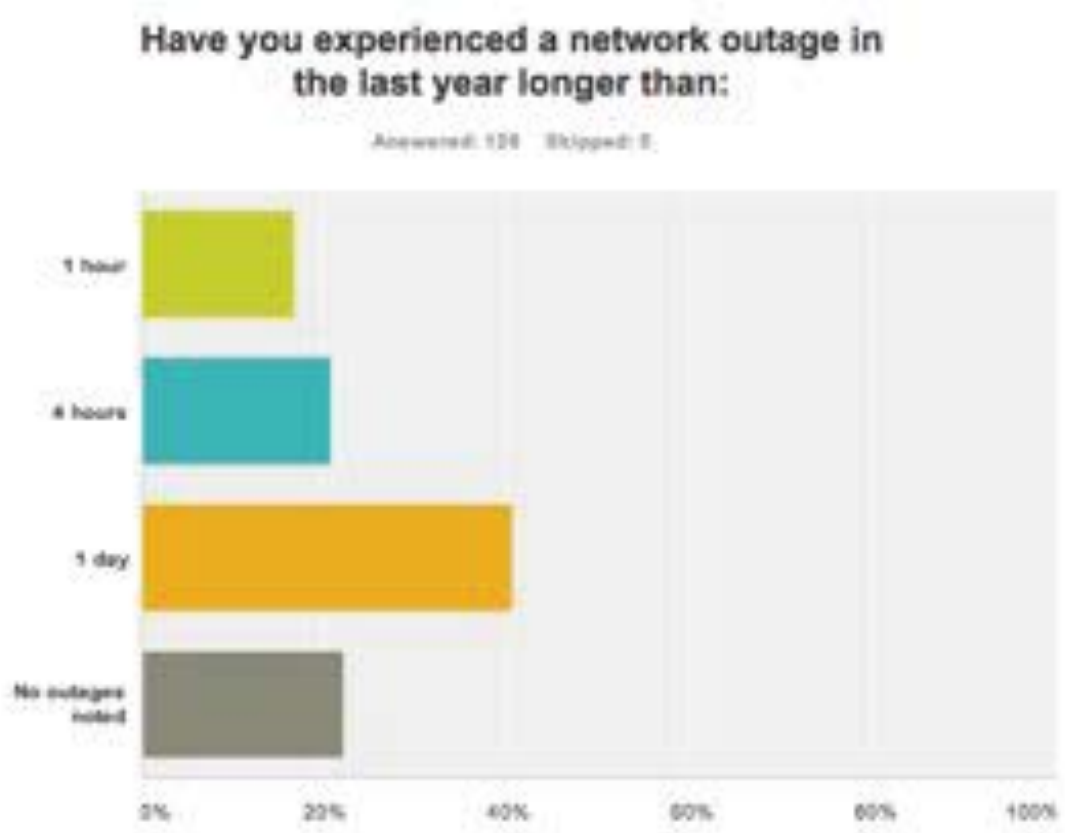
Figure 14 Mobile Pulse: Gilpin county failed upload tests

Identify and catalog most challenged communities

Based on actual speed testing, all communities of Gilpin and Clear Creek are challenged in terms of internet speeds.

Outages

Some 70% of respondents reported that they had suffered at least one outage of one hour or more in the last year.



Answer Choices	Responses	
1 hour	16.67%	21
4 hours	20.63%	26
1 day	40.48%	51
No outages noted	22.22%	28
Total		126

Figure 15 Availability or reliability of the network in Gilpin and Clear Creek counties is severely challenged: 70% or respondents say they have suffered an outage of one hour to one day in the last year. Over 40% report an outage of one day.

Availability %	Downtime per year	Downtime per month*	Downtime per week
90% ("one nine")	36.5 days	72 hours	16.8 hours
95%	18.25 days	36 hours	8.4 hours
97%	10.96 days	21.6 hours	5.04 hours
98%	7.30 days	14.4 hours	3.36 hours
99% ("two nines")	3.65 days	7.20 hours	1.68 hours
99.5%	1.83 days	3.60 hours	50.4 minutes
99.8%	17.52 hours	86.23 minutes	20.16 minutes
99.9% ("three nines")	8.76 hours	43.8 minutes	10.1 minutes
99.95%	4.38 hours	21.56 minutes	5.04 minutes
99.99% ("four nines")	52.56 minutes	4.32 minutes	1.01 minutes
99.999% ("five nines")	5.26 minutes	25.9 seconds	6.05 seconds
99.9999% ("six nines")	31.5 seconds	2.59 seconds	0.605 seconds
99.99999% ("seven nines")	3.15 seconds	0.259 seconds	0.0605 seconds

Table 1 Why downtime matters: "five nines" or 99.999% up time is the standard for the industry. For comparison, a household in Denver can expect 99.999% uptime where Gilpin and Clear Creek county homes and businesses may suffer as low as 99.9% uptime-a significant difference in telecom standards.

Resource Mapping

Why does a community's internet "stink"? Most likely it is due to inadequate resources. The next step in solving the problem is to list and map telecom infrastructure resources. The most critical of which are middle mile resources, i.e., the connection to the outside world.

Inventory of Middle Mile Assets

Middle mile, the "pipe" that connects communities to the outside world, comes in two technology types: fiber optic cable and microwave (wireless).

Fiber Optic Cable Routes

Fiber optic cable is generally deployed in two "flavors": aerial (strung along power transmission or distribution lines) and terrestrial (trenched in conduits usually along highway rights of way.

Aerial Routes

A phone conversation with United Power indicates United Power has no aerial fiber.

Figure 16 United Power footprint. No aerial fiber here

Xcel Energy does not appear to be in a position to contribute to the broadband infrastructure of Clear Creek and Gilpin counties. Currently, Xcel offers no broadband services nor do they appear to make any such assets available for lease anywhere in Colorado. Xcel can (must), per federal telecom regulations, make poles and other facilities available to telecom service providers.

Terrestrial Fiber Routes

There are at least 7 commercially operated middle mile fiber optic routes in Gilpin and Clear Creek counties.

Middle Mile Technology	Route/Location	Vendor/Operator
Fiber optic cable	I-70 (west bound lane)	CDOT (144 strands)
Fiber optic cable	I-70 (west bound lane)	Comcast (leases 2 strands from CDOT's 144 strands, above)
Fiber optic cable	I-70 (west bound lane)	CenturyLink
Fiber optic cable	US 6 and 119	CDOT
Fiber optic cable	US 6 and 119	Crown Castle (leased from CDOT)
Fiber optic cable	Rollinsville via Union Pacific tracks	Level3/Comcast/CenturyLink (share 144 strands of fiber 3-ways)
Fiber optic cable	Rollinsville via Union Pacific tracks	EAGLE-Net (leased from above providers)

Table 2 Inventory of fiber optic middle mile assets in Gilpin and Clear Creek counties

CenturyLink

Figure 17 CenturyLink middle mile through Gilpin and Clear Creek counties

Colorado Department of Transportation (CDOT) and Comcast

Figure 18 CDOT operates a 144-strand fiber route of which 2 strands are leased to Comcast

US 6; Golden to Blackhawk	Crown Castle	Private	Fiber line in corridor for ITS devices	Fiber Line in corridor for private sector use/leasing
US 6; Golden to I-25	Higher Education	Public	(Same as above)	Further expansion of above to Colo School of Mines
I-70; Denver to Vail	Comcast	Private	Cash, line maint, locate services	Communications to reach Vail markets
I-70; Grgetown	City / C.C. County	Public	Gateway Visit Cntr Connection	Interconnectivity to Clear Creek County Sheriff's Office
I-70; Sheriff's Office (pending)	Clear Creek County	Public	Cash, EMS enhancements in corridor	EMS building connections

Table 3 CDOT fiber sharing arrangements on I-70 corridor. CDOT fiber is essentially an open access resource for service providers

CDOT-ITS Fiber Sharing Policies and Primary Agreements

Colorado Department of Transportation has a fiber optic route stretching from Denver to Vail along I-70. That route has 144 strands of fiber. Comcast has use (lease) of 2 fibers for 20 years. Comcast provides ALL maintenance, including

locates, on the line and Comcast pays CDOT ITS $300,000/year cash ($6M total) + consulting services over the term for a total contribution of approximately $15M. CDOT maintains control of our existing fiber asset to use, lease, etc. “The department shall not enter into any exclusive arrangement, lease, or other agreement for use of the public rights-of-way by a telecommunications provider that in any way discriminates or prevents a similar arrangement being made with any other telecommunications provider.”

Any public or private entity may approach CDOT or any party listed in the table below to discuss availability and terms for use of that entities asset. Public sector requests to CDOT may be considered based on in-kind services and/or matters of public safety. In short, all ITS fiber optic strands are open for public or private use, provided that there are fiber strands available for use, and if a partner is able to provide in-kind benefit to CDOT, as noted in the statutes referenced above.

Colorado Department of Transportation and Crown Castle

Figure 19 CDOT and Crown Castle fiber assets in Gilpin county

Crown Castle is one of the nation's top 3 operators of cell towers. Crown Castle has installed fiber in CDOT Right of Way in exchange for CDOT benefit. CDOT benefit included the construction, use of Crown Castle infrastructure such as poles for CDOT devices, room in a regeneration facility, and maintenance of the line - including locates. CDOT has an independent 24-count cable that CDOT may use as it deems appropriate (lease, share, etc. with public or private entities). Crown Castle has a 96-count cable for their own use that they deem appropriate.

Figure 20 For Gilpin county, the only mobile broadband speeds were recorded along CO 119, as a result of fiber to Crown Castle towers.

Level3/CenturyLink/Comcast

Figure 21 Level3, Comcast, CenturyLin fiber route through Gilpin county

EAGLE-Net

Figure 22 EAGLE-Net's September 2013 map of facilities for Gulpin and Clear Creek counties

Microwave

Microwave radios can transmit multiple gigabits per second at ranges of over 50 miles at costs of less than $5,000/mile (compare to trenched fiber which starts at $25,000/mile and aerial fiber at $15,000/mile). Microwave is a relatively low cost middle mile solution for many rural and remote communities.

Figure 23 Thorodin Mountain microwave sites "see" Denver and the Front range providing one-hop middle mile services

Figure 24 Squaw Mountain microwave sites "see" Denver and the Front Range offering one-hop microwave middle mile services

American Tower

Figure 25 American Tower, a leading cell tower operator has towers at the above location that can support microwave operations.

Consolidated Communications Network of Colorado (CCNC)

Colorado is home to the nation's largest public safety two-way radio network, the CCNC with 216 tower sites and over 60,000 public safety subscribers. The figure below illustrates CCNC microwave routes between Clear Creek/Gilpin counties and Denver. The microwave towers illustrated are often located on "antenna farms" where commercial space can be had by commercial service providers who could contribute to improved middle miles services in Gilpin and Clear Creek counties.

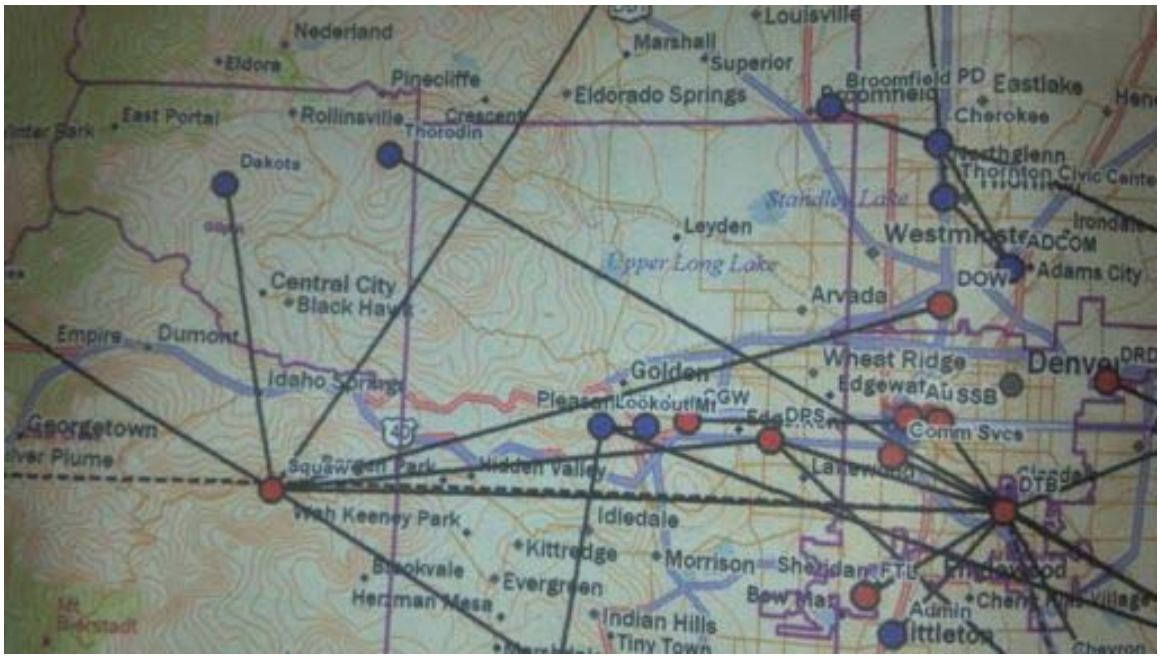


Figure 26 Map of CCNC sites in Gilpin and Clear Creek counties. If not available for commercial use, near by towers can be used for commercial purposes
http://ccncinc.org/images/stories/maps/jan2011_sites.gif

Summary of Middle Mile Resources

Middle Mile Technology	Route/Location	Vendor/Operator
Fiber optic cable	I-70	CDOT (144 strands)
Fiber optic cable	I-70	Comcast (leases 2 strands from CDOT)
Fiber optic cable	I-70	CenturyLink
Fiber optic cable	US 6 and 119	CDOT
Fiber optic cable	US 6 and 119	Crown Castle (leased from CDOT)
Fiber optic cable	Rollinsville via Union Pacific tracks	Level3/Comcast/CenturyLink (share 144 strands of fiber 3-ways)
Fiber optic cable	Rollinsville via Union Pacific tracks	EAGLE-Net
Microwave	Thorodin Mountain	Mountain Broadband, CCNC, other commercial providers
Microwave	Rollinsville, Central City, Idaho springs, Georgetown	American Tower
Microwave	Squaw Mountain	CCNC, other commercial providers

Table 4 Last mile providers might have access to up to 10 middle mile resources

Inventory of Last Mile Providers by Community

Town	Providers
Silver Plume	CenturyLink AT&T Verizon T-Mobile
Georgetown	CenturyLink AT&T Verizon Sprint
Idaho Springs	CenturyLink AT&T Verizon Sprint T-Mobile JAB Broadband Comcast
Central City	CenturyLink AT&T Verizon Sprint USA Communications
Blackhawk	CenturyLink AT&T Verizon Sprint JAB Broadband USA Communications
Rollinsville	CenturyLink AT&T Mountain Broadband Nedernet

Table 5 Inventory of last mile providers by town

Inventory of Switching Facilities

Traditionally, telecommunications services have been routed through the telephone company's central office. Most notably, fiber optic cable from CenturyLink connects some majority of central offices.

Town	Street Address
Central City	114 Spring Street, Central City, CO
Idaho Springs	1601 Miner Street, Idaho Springs CO
Georgetown	500 Argentine Street, Georgetown, CO

Table 6 Inventory of CenturyLink central offices for Clear Creek and gilpin counties

Figure 27 DSL availability in Clear Creek and Gilpin counties assuming only DSLAMs are located in central offices

Forty-four per cent of respondents access the internet via CenturyLink DSL. The closest competitor is Verizon's mobile data service at 8% with AT&T mobile data

and Comcast cable modem service at 7% each. Both Verizon may be getting their middle mile services from CenturyLink. An industry rule of thumb states that DSL is available up to 15,000 feet (or about 3 miles, assuming the copper wires are in good condition and not aged) from the Digital Subscriber Line Access Module ("DSLAM", the device that enables DSL service). the figure above illustrates the range from the CenturyLink central offices in Gilpin and Clear Creek counties at which DSL subscribers might reasonably get advertised speeds.

The range of DSL service can be extended by deploying DSLAMs to pedestals (those steel boxes on street corners) miles remote from the central office and feeding them via copper wire (T1 at 1.54 Mbps, DS-3 at 45 Mbps) or fiber optic cable (Gigabit Ethernet, metro optical ethernet or "MOE" at up to 1 Gbps speeds).

Identify deficiencies in cellular services and/or methods for local governments to document deficiencies

Gilpin County has a contract with Mobile Pulse and county employees have been asked to download the app and utilize it to gather data on cellular services in Gilpin County. Data provided by Mobile Pulse for the this project can be analyzed beyond the broadband performance data to assess deficiencies in cellular services with cellular providers contracted by Gilpin and Clear Creek counties. Of note,

-less than 10% of the "hits" resulted in actual bi-directional data transmissions.

-broadband as defined by the FCC is available from cellular providers on short stretches of CO 119, US 6 and I-70 in Gilpin and Clear Creek counties.

-despite an abundance of fiber optic cable as middle mile capacity in Gilpin and Clear Creek counties, cellular providers appear to be slow in deploying 4G services that, at a minimum might provide broadband services to residences and small businesses (although “caps” on the total amount of bandwidth consumed could be expensive for some).

Figure 28 Comparison of data collected by Mobile Pulse platform and manually

Demand Mapping: An Assessment of Needs

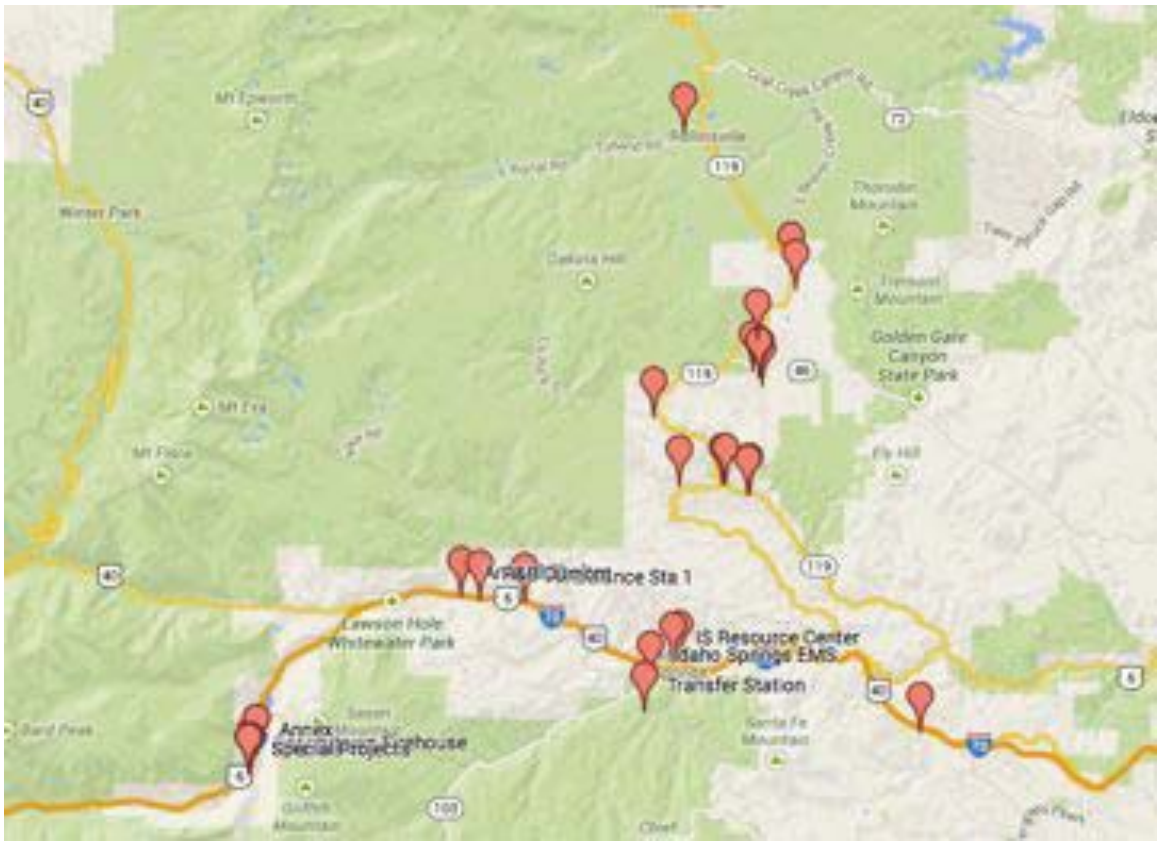


Figure 29 Inventory of community anchors that subscribe to relatively large quantities of bandwidth representing relatively high levels of demand for last mile services

A survey of community anchor institutions and businesses was conducted in September 2013. There were 11 responses from a list of 32 invitees. While all of Clear Creek and Gilpin counties are within a one-hour drive from downtown Denver and perhaps hundreds of strands of fiber optic cabling pass through both counties (some majority of it dark), most businesses and community anchor institutions pay (relative to Denver prices) extremely high prices for (relative to Denver) very slow internet speeds and unreliable service (frequent outages).

Location	Address	Provider	Type	Monthly cost	Cost Mbps Month	Would Like to Buy (Mbps)
City of Black Hawk	201 Selak St. Black Hawk, CO 80422	CenturyLink	13 Mbps Bonded pair of T1's and high speed over copper	$1,200.00	$100	100 Mbps
Riviera Black Hawk, Monarch Black Hawk Inc.	444 Main Street, Black Hawk, CO 80422	Century Link and Integra Telecomm	DS3 and T-1	$5,700 for our DS3 and $650 for the 10MB T-1 pipe.	$115 for DS3 and $65 for 10 Mbps circuit	100 Mbps
Gilpin County Garage	135 Tolland Rd Rollinsville, CO 80474	Cbeyond,(reseller CenturyLink) USACommunications	T1s and Cable modem	Not reported		5 Mbps
Gilpin County Courthouse	203 Eureka Street, Central city, CO 80427	Cbeyond,(reseller CenturyLink) USACommunications				20 Mbps
Gilpin County Government	495 Apex Valley Central City CO 80427	Cbeyond,(reseller CenturyLink) USACommunications			$30	10 Mbps
Gilpin County Sheriff's Department	2960 Dory Hill Road, Black Hawk, CO 80422	Cbeyond,(reseller CenturyLink) USACommunications				10 Mbps
Gilpin County Government	101 Norton Drive, Black Hawk, CO 80422	Cbeyond,(reseller CenturyLink) USACommunications				10 Mbps

Gilpin County Recreation Center	230 Norton Drive, Black Hawk, CO 80422	Cbeyond,(reseller CenturyLink) USACommunications			10 Mbps
Gilpin County Community Center	250 Norton Drive, Black Hawk, CO 80422	Cbeyond,(reseller CenturyLink) USACommunications			10 mbps
Gilpin County Government	15131 Hwy 119, Black Hawk, CO 80422	Cbeyond,(reseller CenturyLink) USACommunications			10 Mbps
Gilpin County Government	255 Braecher Park Road, Black Hawk CO 80422	Cbeyond,(reseller CenturyLink) USACommunications			10 mbps
Isle and Lady Luck Casinos	401 Main Street, Black Hawk, CO 80422	Verizon MPLS			50 Mbps
Home office, B&B		Century LinkDSL		$57 for Internet & phone	10 Mbps
Ed and Shirley's Inc	120 Main Street, Black Hawk, CO 80422	T!			100 Mbps
Firestarter	1802 Placer St. Idaho Springs CO	century link			10 Mbps
I am a consultant at 6 casinos in Black Hawk/Central City - I work out of my home in Dory Lakes, GIlpin County	Dory Lakes, GIlpin County	home office - cable modem from USA Communications	4 Mbps		

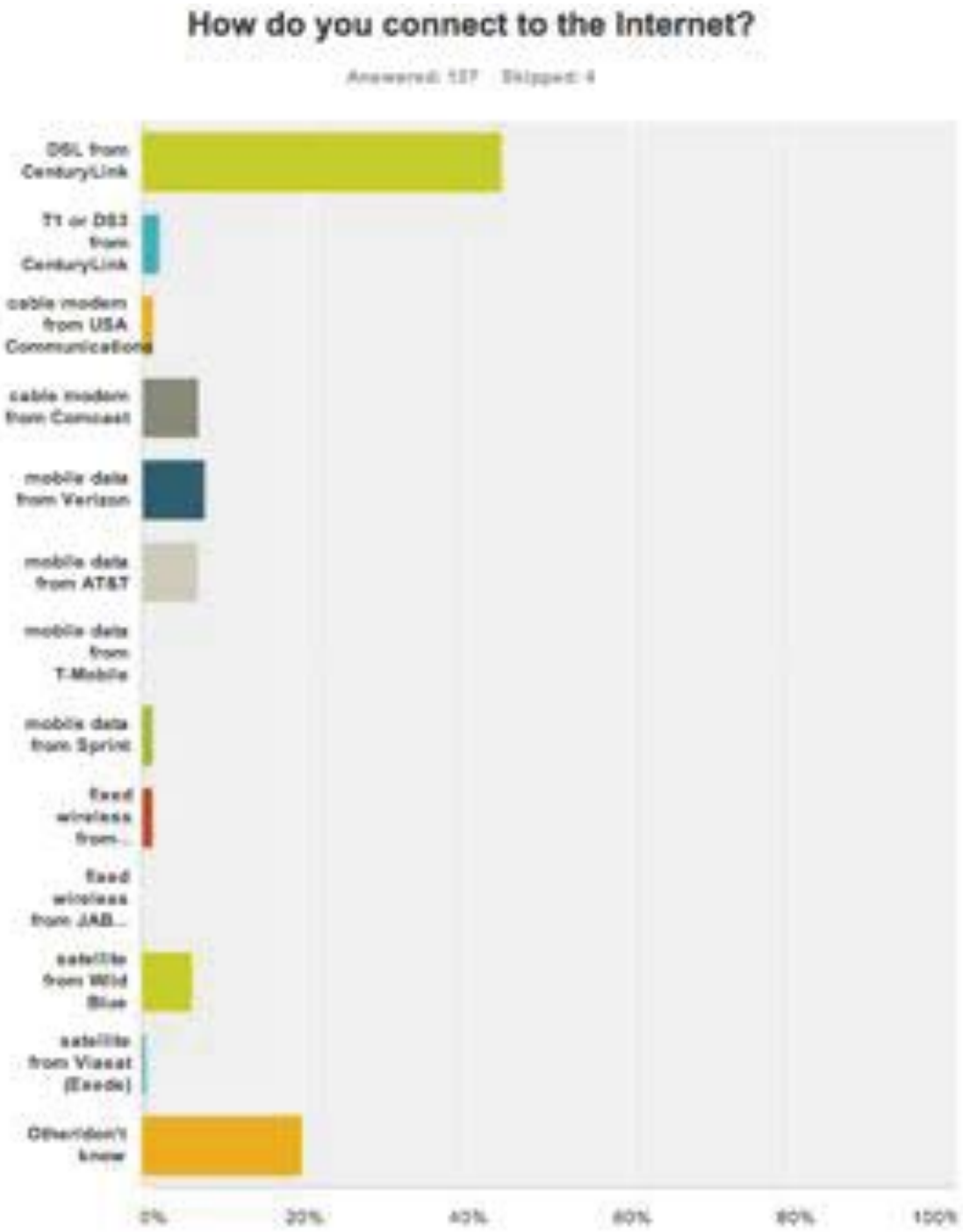
Idaho Springs City Government		Century link	15 mbps	$520.00		Don't know all we know is we are limited by supplier availability
Clear Creek School District	185 Beaver Brook Canyon Rd. Evergreen, CO 80439	CenturyLink	100 Mbps QMOE Fiber Connection from CenturyLink	$870.00	$87	100 Mbps

Table 7 Synopsis of survey of community anchor institutions and businesses in Clear Creek and Gilpin counties

More provider competition. Century Link is not very reliable.
As you know, we need more options than USAComm and CenturyLink
Abundant with different options than Century Link
I have great service compared with some of my fellow Gilpinites!
We need more cell coverage in rural Gilpin County before worrying about additional internet providers. Affordable would be really good!
Need secondary middle mile in CCC for reason described in # 6 above for redundancy. These days children are relying on the internet heavily during and after school Having the school district(s) involved in this process is a must. Clear Creek County also has issues with cellular broadband/service. Getting a solid backbone in the county could improve cellular services, which in turn would improve emergency services in the County.
Options that make pricing competitive and affordable

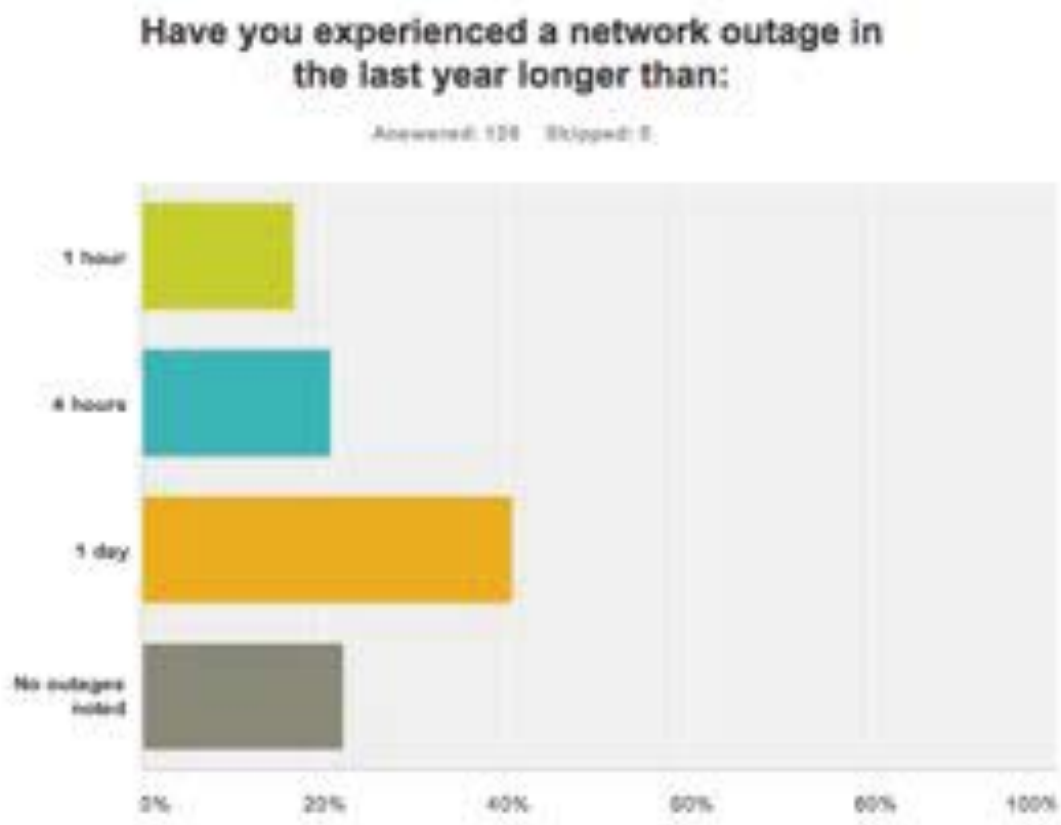
Table 8 Comments from community anchor and business survey

Results of Residential Survey



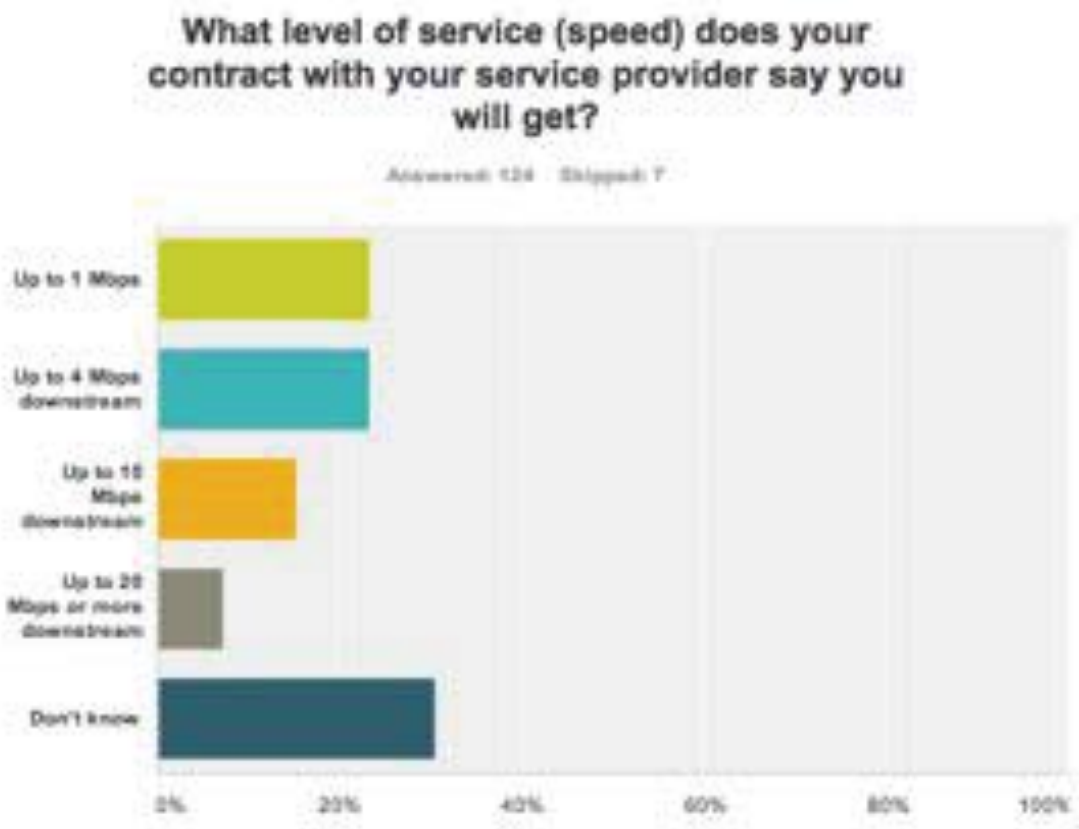
Answer Choices	Responses	
DSL from CenturyLink	44.09%	56
T1 or DS3 from CenturyLink	2.36%	3
cable modem from USA Communications	1.57%	2
cable modem from Comcast	7.09%	9
mobile data from Verizon	7.87%	10
mobile data from AT&T	7.09%	9
mobile data from T-Mobile	0%	0
mobile data from Sprint	1.57%	2
fixed wireless from Mountain Broadband	1.57%	2
fixed wireless from JAB Broadband	0%	0
satellite from Wild Blue	6.30%	8
satellite from Viasat (Exede)	0.79%	1
Other/don't know	19.69%	25
Total		127

Figure 30 How Clear Creek and Gilpin counties connect to the Internet



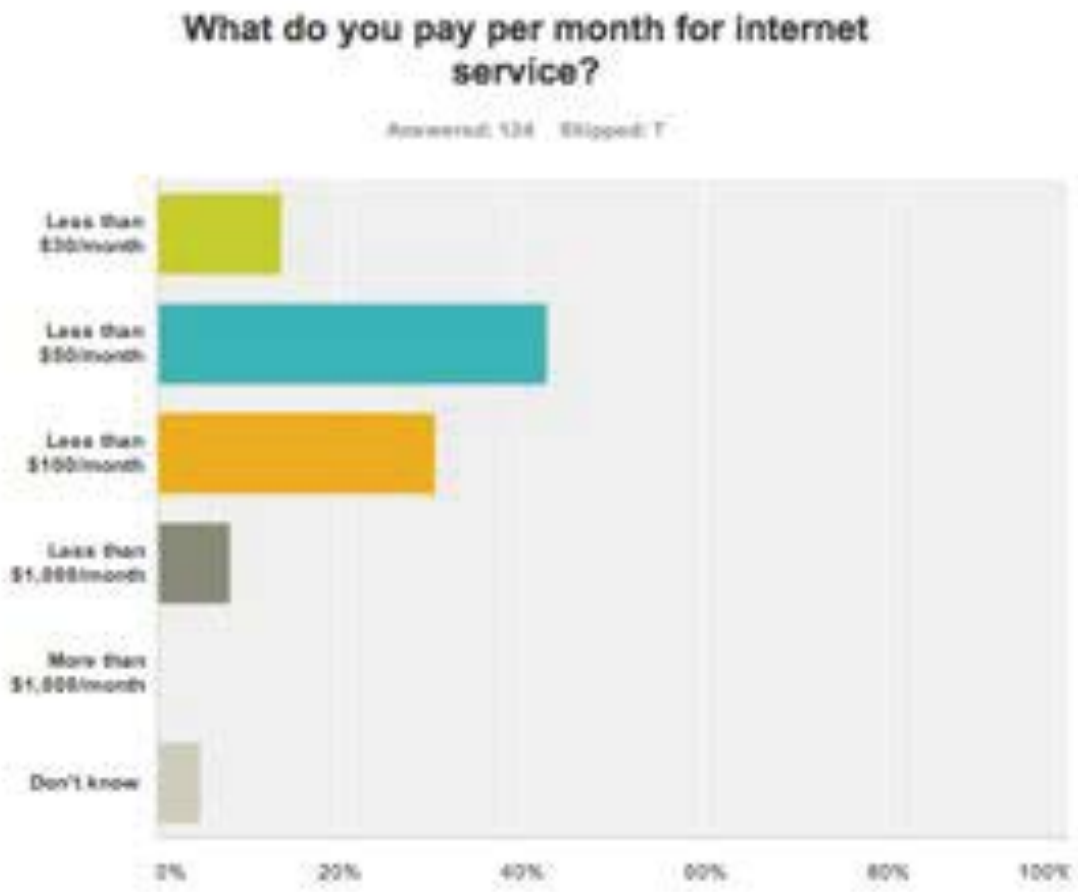
Answer Choices	Responses	
1 hour	16.67%	21
4 hours	20.63%	26
1 day	40.48%	51
No outages noted	22.22%	28
Total		126

Figure 31 Some 70% of survey respondents report outages of up to one day in the last year



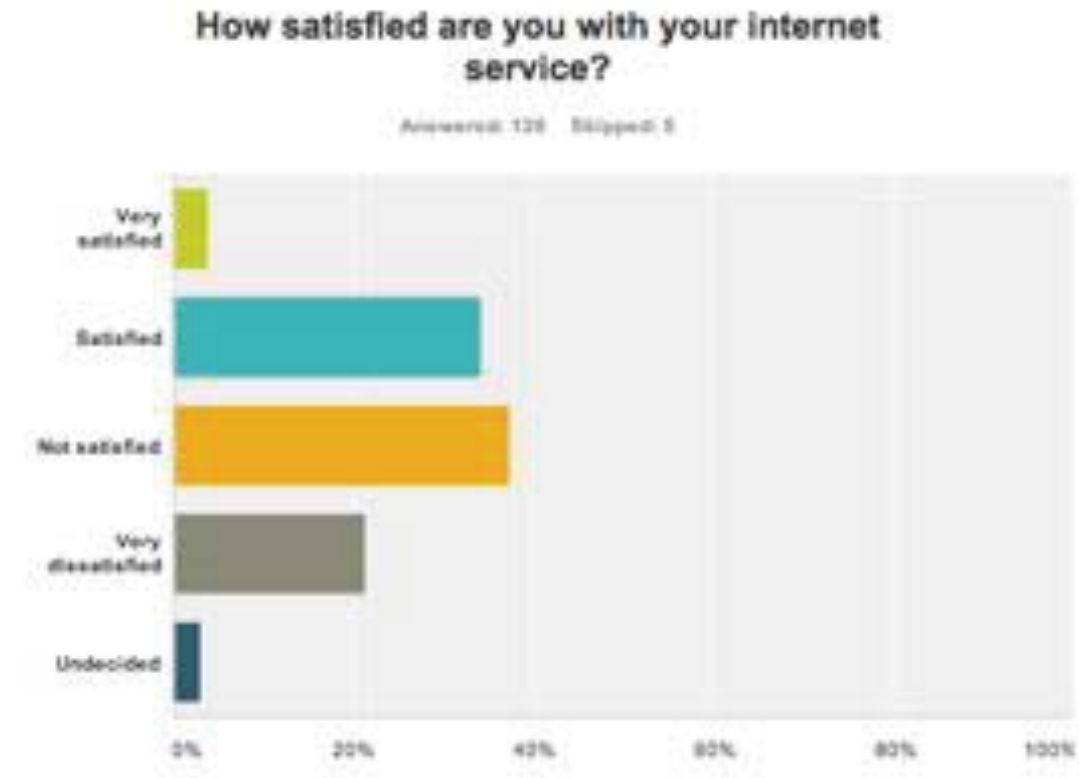
Answer Choices	Responses	
Up to 1 Mbps	23.39%	29
Up to 4 Mbps downstream	23.39%	29
Up to 10 Mbps downstream	15.32%	19
Up to 20 Mbps or more downstream	7.26%	9
Don't know	30.65%	38
Total		124

Figure 32 Almost half of respondents subscribe to speeds less than the FCC's definition of broadband. Given results of speed tests, it appears that this is a function of what is actually available to subscribers



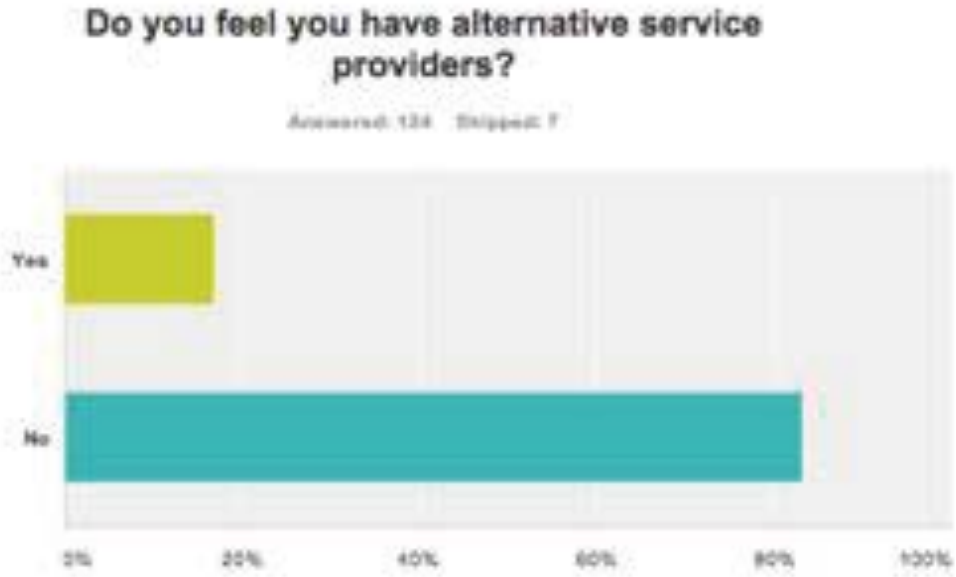
Answer Choices	Responses	
Less than $50/month	13.71%	17
Less than $50/month	42.74%	53
Less than $100/month	30.65%	38
Less than $1,000/month	8.06%	10
More than $1,000/month	0%	0
Don't know	4.84%	6
Total		124

Figure 33 Most respondents pay less than $50 per month for their internet service.



Answer Choices	Responses	
Very satisfied	3.87%	5
Satisfied	34.13%	43
Not satisfied	37.30%	47
Very dissatisfied	21.43%	27
Undecided	3.17%	4
Total		126

Figure 34 Over half of respondents are dissatisfied with their internet service.



Answer Choices	Responses	
Yes	16.94%	21
No	83.06%	103
Total		124

Figure 35 Respondents overwhelming feel they have no alternatives in internet service providers

Analysis

1. Some two-thirds (67% or so) of respondents are dependent on CenturyLink middle mile services. Given the high level of outages (70% of respondents report outages of at least an hour in the last year with almost half reporting day-long outages), it could be assumed that one significant factor in the outages may be related to CenturyLink middle mile services. Is it possible that CenturyLink middle mile services are not taking advantage of gaining redundancy and higher "up" times by contracting with CDOT or Crown Castle to use their fiber routes along I-70 or US 6, nor are they attempting to connect to CenturyLink middle mile fiber that runs through Rollinsville. Alternatively, CenturyLink could avail itself of microwave services off Thorodin Mountain or Squaw Peak as redundant middle mile.

2. 47% of respondents have contracts that deliver less than 4 Mbps upstream, the FCC's threshold for broadband. Only 22% have contracts that deliver speeds greater than the FCC's definition of broadband.

3. Price of internet services does not seem to be a factor in buying internet service. It might be assumed that consumers would be willing to pay more for reliable, fast internet service.

4. Fixed wireless from Skybeam/JAB/Mountain Broadband/Nedernet appears to be widely available, however, community anchor institutions do not seem to be taking advantage of these alternative service providers. Communication between suppliers and potential subscribers detailing a) availability of services b) speeds of

services c) pricing of services and d) reliability of services might remedy the differences between expectations and what's available in this market.

5. Cable modem service is a popular alternative in urban/suburban markets, but not in Gilpin/Clear Creek counties. This is probably due to a) small footprint for coaxial cable infrastructure b) aging coaxial cable infrastructure c) cable modem providers probably buy their middle mile services from CenturyLink. It is not clear why Comcast, which leases 2 strands of fiber from CDOT (I-70) does not offer Denver-area speeds (50 mbps and 100 Mbps packages) in the communities it serves in the Gilpin and Clear Creek county markets.

Recommendations: Next Steps

1. Once approved by respective county governments, this report and especially the results of the surveys should be made available to the public (downloadable from county government websites). Issuance of a press release to local and state media will lay the foundation for Recommendation #2 below.

2. A Request for Information (RFI) should be issued by Gilpin and Clear Creek counties to local and national service provider communities inviting proposals to better serve the communities of Gilpin and Clear Creek counties. This serves as an online auction of demand in exchange for service.

3. Consider proceeding with Modules III, IV, and V from Internet3 Proposal

Appendix A: Request for Information (RFI)-What Can Service Providers Offer Community Anchors of Gilpin and Clear Creek Counties?

Per the above report, Clear Creek and Gilpin county community anchor institutions suffer from high cost of internet bandwidth in $/Mbps/month and relatively low reliability.

Per the above report, there are at potentially 10 sources of middle mile services to the region which could contribute to a middle mile market that is "redundant, abundant and affordable".

Please provide information regarding services you can provide to community anchor institutions, businesses and residences in Clear Creek and Gilpin counties by:

a. Technology type
b. Price in terms of $/Mbps/month
    i. For community anchor institutions
    ii. For businesses
    iii. For residences and home offices
    iv. Length of contract necessary to deliver such services (month-to-month/1 year/5 year)
c. When your firm can deliver services to these communities

Appendix B: Comments from Survey Respondents-Residential

The most valuable data collected from surveys comes in the "Comments" section.

8- I have to pull plug on wireless modem every time I turn off computer or I won't get internet service when I turn on computer. Have to plug modem in first-wait a few minutes and then turn on computer. Maddening. If I leave it on all day I lose my internet connection too. It is century link but not sure if DSL or T 1. #9 I have never checked out other ones.
Advertised at up 12 Mbps....generally in 8-10 range. Up loads are 1-3 Mbps....have to occasionally reset the modem....
I am supposed to have 1.5 speed (It slows to dial up speed at 6 pm most evenings), I have been with out service for 1 to 3 days at a time with constant outages at any time durinng the day this year. I have sent an email to Jeannie Nicholson about this problem over a month ago, asked her about looking into regulation of the internet that comes over the phone (the phone companys are regulated) & have had no acknowlegement of the email.
Typical speed 430 kbps download, 750 kbps upload.
I really hope there is a massive effort to improve internet and cell phone availability along the Front Range. Thanks!
We use HughesNet because it is the best available here. Sadly, satellite drops too often and my fiance may lose his job as he works from home via the internet
Down for 4 months then reliable. Skybeam.com
majority of the time do not have wireless access, thus lan line continues, cell phone inconsistent.
CenturyLink DSL network overloaded in Echo Hills. Only 2 satellite providers available as options.
We need high speed internet on Spring Gulch and Zip trail. The population in this area is growing and needs this now
we don't feel we have any other options and the current service is VERY slow even when they claim it should be faster. We are also having consistent issues where our smart phones and tablets will not connect to the internet even though wireless computers are connecting
I would like to see faster internet capabilities at my location at reasonable cost.
data usage is too expensive. 25GB per month costs $150 and it is not enough to look at videos/pix/email/etc

I use SkyBeam service.
CenturyLink DSL sells us 7 Mbps but we're lucky to get 1.5 - shady business practice to sell something that isn't really what is in the contract, but there is no other competition. Verizon does allow VPN. So I drive an extra 200 miles per week because I don't have a reliable Internet service, which is required for teleworking.
What we'd really like is a cell phone tower that this side of the mountain can actually "see". After that, some kind of broadband would be nice so we can get TV. We dropped directTV because it was outrageously expensive and offered 500 channels of crap. It wasn't worth paying over 1200 a year just to watch some broncos games. so, the test tells me that we get about 2 down and 3 up; our provider tells us we're supposed to get 5 up and 5 down. Sometimes we do, sometimes not. We use Nedernet line of site microwave.
I use Autonet Mobile - fastest and most consistant service I've ever known. I point my antenna toward Denver and the router chooses the tower with the best signal. The system works in cars and as a stationary unit, in my case directly from my solar pannel batteries. You should look into them...
Would love to have a real internet option!
question 4, we pay for up to 1.5Mbps but most evenings it is less than .4
VERY slow service. Overloaded. No cell service available.
More Radio based wireless transmitters. There is only one on top of Dory Hill road
would like better options for internet
Please make the situation better. Thank you.
Skybeam was terrible. They oversold the bandwidth but their customer service people just kept sending repair people out even though there was nothing they could do. This lasted for multiple months. At one point when we check our download speed it was 32bps. We are satisfied with our current provider but it could be improved as well.
I know Gilpin County Library has an alternative to Century Link (and maybe other providers); if I could get an alternative to my Century Link external modem to avoid power outage blips, I would! If the price is right. . .
My ISP is Magnolia Road Internet Cooperative
I need bi-directional speed and would appreciated leaving CL's copper behind. Old buried lines, over capacity, and failing insulation means I loos phone and internet too frequently.
We desperately need improvement in Internet speed and reliability. Thanks
There is no internet access with my iPhone due to lack of AT&T network signal. I

do have DSL access to my laptop via CenturyLink but the speed is less than 1 meg down and 600K up.
I work for CenturyLink and circulated a petition 2 years ago for CenturyLink to install high speed internet to the Fall River Road/Alice, St. Mary's & Winterland communities. Received 100 signatures. CenturyLink has tentatively scheduled DSL, NOT broadband, for 2015, but that's not set in stone, and not everyone will be able to get it, which includes my address. We all want something sooner and faster. Question 4 should have "Dialup from CenturyLink" as an option because DSL is not available to us on lower Fall River Rd. Parts of upper Fall River do have DSL, but we have older equipment and its more of an investment for Centurylink to upgrade it. Question 5: The fastest speed we get is less than 28.8 KB for $20/month--"Up to 1MB" would seem screaming fast to me. Question 9: Of all the ones I've checked out service was not reliable and was very expensive. I would pay up to $50 a month for reliable fast service.
I would really like to have better Internet service.
We would like to have Centurylink provide DSL service in this area.
we also try to use the internet to stream television and movies with mixed results. Many times there are breaks for downloading
I switched from Verizon to AT&T about 7 months ago when Verizon went down for over a week. I'm very hight at 10,500 feet and am in a pocket with minimal coverage. The AT&T worked GREAT for 3-4 months but when a handful of summer residents returned, it's been challenging to get & keep a signal. The techs at AT&T agree the signal is so week that just a handful of extra people using the tower is eating up the broadband availabilty. There are 3 towers nearby.. 2 in Winter Park (one has been down for repairs for months, the other is degraded)... the 3rd is the one I'm supposed to connect to but it's been degraded on a regular basis this summer in addition to low signal. I just added a landline though CenturyLink this week because my cell service is so poor, unfortunately they don't offer DSL yet for my address (it's nearby, but not here yet). Thanks for any help you can give us, there truly IS a need for internet service in our County.
I am an I professional that is very concerned with latency. DSL is my only option, but I need faster speeds to perform my job.
We actually LOVE our service when it works. We've been with Wispertel (bought out by Skybeam) for many years, but we've had a lot of technical issues. We just can't afford comcast, and don't want to go with CenturyLink (both have tech support in India), we like the idea of a local company, with local support, like we have now... but we need it to work better.
providers should have to meet a minimum bandwidth the "up to xx Mbps" is a total falsehood. It is never met. and the more customers the slower it gets! and penalizing a "heavy user" (throttling) is not what I pay for
I use skybeam in my house. I only pay for the 5Mbps plan, and it runs SLOW. I was suprised to see 18.72 down and 1.48 up with a ping of 68 on my phone. My

skybeam just clocked in at 9ms ping, 2.05 down and .96 up.
Answers based on Verizon hot spot experiences of the past two years. No cell phone service from this address. Recently switched to Hughes Net satellite. Internet some better but cell phone service remains poor.
We are satisfied with the constant and dedicated internet connection however faster speed would be nice.
I use skybeam.
We used to have Verizon but it was worthless. We recently upgraded to HughesNet. It's better but still not that fast.
I am considering a satellite provider. However, all service is very expensive on a limited income
I live in a high altitude community at St. Mary's/Alice. DSL is available to part of our neighborhood but not all of our neighborhood. It would be beneficial to have DSL available to everyone up here and not just some of us.
testmy.net indicates my speed is 4 or 5% of wildblue.net customer average
Top speed with CenturyLink is substandard by any benchmark. 1.5 Mps with no faster option and no real alternative.
We are currently using skybeam and the service never delivers the bandwidth advertised (i.e. 2.5 mpbs v. 8mbps). Additionally, there are numerous service interruptions. Still, when working, the speeds are generally faster than any known alternatives available (quest 1.5 mbps).
Recently ended contract with Skybeam after losing service for 2 weeks and service visit did not resolve problem. My only other choice was Hughes.Net. More expensive and now have ugly dish!
It would be awesome to have faster speed. I could then afford to work from home more frequently.
I am happy with the Skybeam internet service, but would like enough bandwidth to receive a telephone alternate over my internet correction. Skybeam does not provide sufficient bandwidth for phone at this location (626 Conifer Dr.- Evergreen) now.
I would like Century Link to offer service along Fall River Road.
Would like to get faster Internet. Century Link doesn't yet have it in our area. Also, there are fairly frequent outages, which a typically relatively brief, but. Nonetheless annoying.
DSL in Echo Hills is relatively slow and getting slower I would love another faster option for under $50 per month for unlimited

Cost is prohibitive, but feel it necessary this day and age.		
Have contacted Century Link with my concerns, but they have no desire to improve infastructure		
this area needs better cell phone coverage		
Satelite only alternative, and too expensive		
forget the app there are many ways to test speed and Centurylink for no intentions of upgrading our area for 10 years according to their engineers.		
Of course, heavy traffic on I-70 highly impacts both speed and service		
Speed has been a problem. Have changed modems twice but doesn't seem to help. I call and the speed improves. After a few days, the speed starts to degrade. I have used the speed test on CenturyLink many times. Would love to have some alternative choices and also speedier WIFI.		
Town of Georgetown has several site we could us better service		
Very limiting options in my neighborhood for internet. Satellite only due to geographic topography.		
Alternative may be available but to expensive and not dependable.		